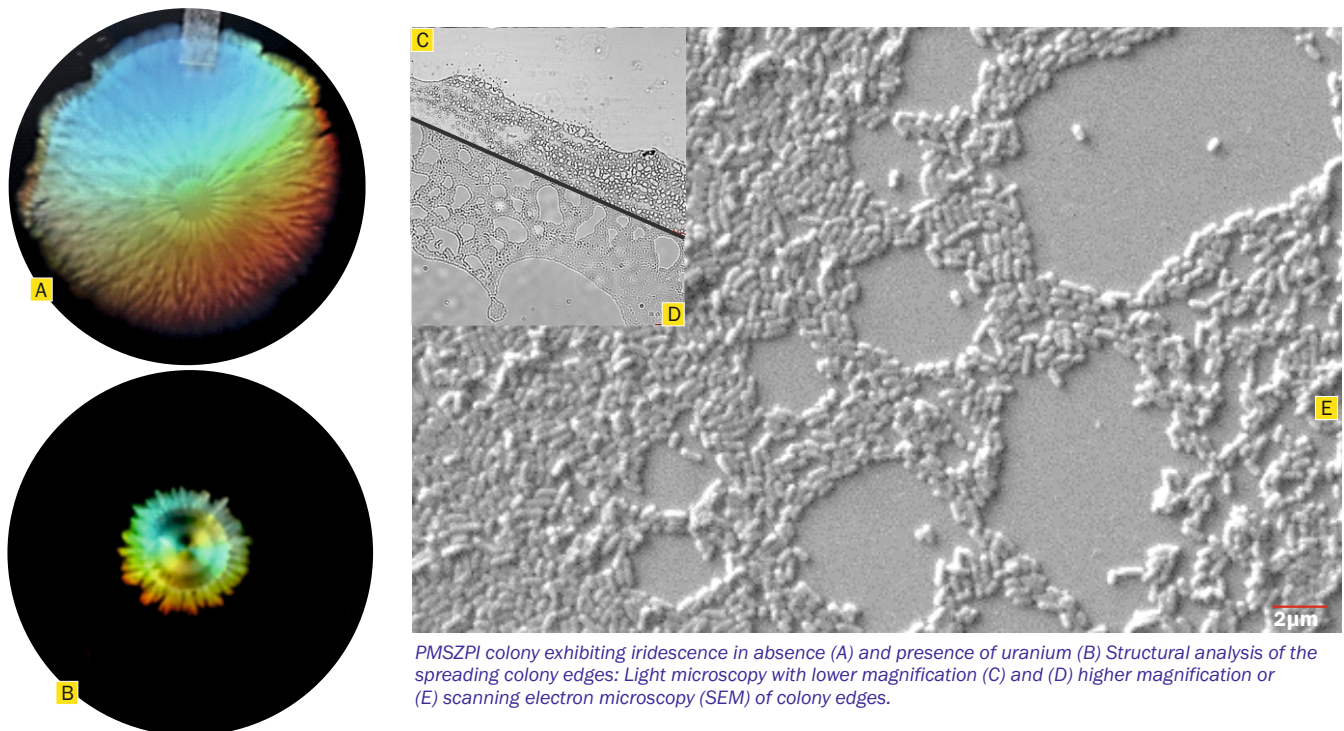


Microbial Iridescence

An interesting feature in a Uranium Tolerant Bacterium Chryseobacterium...



PMSZPI colony exhibiting iridescence in absence (A) and presence of uranium (B) Structural analysis of the spreading colony edges: Light microscopy with lower magnification (C) and (D) higher magnification or (E) scanning electron microscopy (SEM) of colony edges.

The spreading colonies of the gliding bacterium *Chryseobacterium* sp. strain PMSZPI displayed self assembly of cells into highly ordered structures which on illumination with natural light exhibited bright iridescent colours.

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It has been over a decade that our laboratory is actively engaged in investigating the mechanisms of uranyl interactions with microbes that are important for uranium bioremediation. In that context, we demonstrated the notable tolerance of a bacterium, *Chryseobacterium* sp. strain PMSZPI, isolated from the subsurface soil of Domiasiat uranium (U) ore deposit in Northeast India to uranium and other heavy metals. The genome of PMSZPI was sequenced and the first draft sequence was released in 2017 with NCBI Genbank Accession No. PIZV000000000.

Recently, we reported the interesting phenomenon of iridescence in PMSZPI that was found to be associated with its gliding motility (D. Khare *et al.*, 2022, *Gliding motility of a uranium-tolerant Bacteroidetes bacterium Chryseobacterium* sp. strain PMSZPI: insights into the architecture of spreading colonies, Environmental Microbiology Reports, Cover page article). The word 'iris' derived from the Greek meaning rainbow, is an optical effect attributed to the surfaces that change in colour and intensity with the viewing angle. The strain PMSZPI harbored majority of the Bacteroidetes gliding motility genes and formed spreading colonies as a result of gliding on agar surfaces. Such colonies were intensely coloured when observed under trans-illumination with natural light. *In-situ* structural analysis of the spreading colony edges revealed the self assembly of the cells that are periodically arranged in lattice-like structures which possibly diffracted the incident light causing angle dependent iridescent appearance of the colonies. It was observed that uranium negatively affected the colony spreading although the periodicity within the cellular population at colony edges was found to be intact displaying iridescence. Bacterial iridescence has been reported under stressful conditions. It could possibly provide novel bio-material for photonic applications like paints and coatings.

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